DOCUMENT RESUME

ED 092 568 95 TM 003 670

AUTHOR Holland, John L.
TITLE The Use and Evaluation of Interest Inventories and Simulations.
INSTITUTION Johns Hopkins Univ., Baltimore, Md. Center for the Study of Social Organization of Schools.
SPONS AGENCY National Inst. of Education (DHEW), Washington, D.C.
REPORT NO R-167
PUB DATE Jan 74
NOTE 58p.

EDRS PRICE MF-$0.75 HC-$3.15 PLUS POSTAGE
DESCRIPTORS *Evaluation; *Improvement; *Interest Tests; Occupational Guidance; *Sex Discrimination; Simulation; *Test Bias; Test Validity

ABSTRACT

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ED 087 518

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Center for Social Organization of Schools

Report No. 167

January 1974

THE USE AND EVALUATION OF INTEREST INVENTORIES AND SIMULATIONS

John L. Holland

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The Johns Hopkins University

STAFF

John L. Holland, Director

James M. McPartland, Assistant Director

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Judith P. Clark

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Dean H. Nafziger

James M. Richards

John P. Snyder

Julian C. Stanley

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JOHN L. HOLLAND

TM 003 320

REPORT NO. 167

JANUARY, 1974

Published by the Center for Social Organization of Schools, supported in part as a research and development center by funds from the United States National Institute of Education, Department of Health, Education and Welfare. The opinions expressed in this publication do not necessarily reflect the position or policy of the National Institute of Education, and no official endorsement by the Institute should be inferred.

The Johns Hopkins University

Baltimore, Maryland

Acknowledgement

I am indebted to the following people for their counsel and editorial assistance. Because I did not always use their advice, I am solely responsible for the content of this paper. My readers included: J. Page Clark, Joyce Epstein, Gary Gottfredson, Ellen Greenberger, Elsie P. Holland, John H. Hollifield, and Dean H. Nafziger.

Abstract

This paper provides a general perspective for evaluating interest inventories and simulations and outlines some activities to stimulate the development of more useful inventories. Previous evaluations have been primarily instrument-specific, have relied generally upon opinion rather than evidence, and have focused only on possible sex, age, race, or social class biases. Possible sex bias, especially, has received much attention. The scientific evidence examined, however, suggests that interest inventories lack sex bias, and that a strategy of seeking to improve inventory effects for everyone will be more productive than focusing on specific biases.

The Use and Evaluation of Interest Inventories and Simulations

This paper is another contribution to current discussions, workshops, commission reports, journal articles, and governmental activities concerned with sex biases in interest inventories (AMEG Commission, 1973; Huth, 1973; Campbell, 1973a, Harmon, 1973, and others). These earlier evaluations are limited because they have centered upon the virtues and weaknesses of specific inventories, and because they lack good definitions of sex bias, focus on a single aspect of sex bias, or lack documentation for their hypotheses.

This paper is a third attempt (Holland, 1973b, 1973c) to clarify some of the issues involved in the evaluation of interest inventories and simulations, and to outline some helpful activities for stimulating the development of more useful inventories. The key assumption in this discussion is that a general perspective--how to build better inventories--will be more helpful for everyone (consumers, practitioners, developers, and publishers) than a continuation of instrument-specific evaluations, relying upon opinion rather than evidence, and focusing only on possible sex, age, racial or social class biases. At the same time, both general and specific perspectives for coping with the questions of sex bias require better definitions and resolutions of the following questions:

1. What is sex bias? The NIE definition (alias "tentative definition") contains so many undefined terms that almost anyone or any influence may be charged with sex bias.
2. What procedures or tests will provide an unbiased assessment of the sex, age, social class bias of an interest inventory?

Without a generally accepted criterion for the assessment of sex bias, we cannot determine wich any objectivity the presence or absence of sex bias. For example, if we could not agree that the average yardstick is a reasonable approximation of one yard, we could not agree about the length of large objects. Unfortunately, determinations of bias involve more complex measurement problems.

3. What does "sex-fair" mean? What is a "sex-fair" interest inventory?

4. Are interest inventories and simulations worth the costs? All treatment procedures--psychological, medical, and sociological--have social costs as well as benefits. The current discussions about the value of interest inventories raise questions of cost. For example, should interest inventories be abandoned because some small proportion of the population believes they are harmful to some women? When are the costs (if they are documented) high enough to make such recommendations? On balance, do the benefits clearly outweigh any costs?

5. Are any inventory revisions justified by the available evidence?

6. What are the most practical and promising avenues for improving the quality of interest inventories? Shall we sacrifice validity for social action?

7. Does NIE or OE have any regulatory function in the area of vocational guidance? The proposed guidelines for interest inventories will tend to have the force of legislation even if offered only as guidelines. Should we rely more on the ingenuity and good will of authors and publishers for desirable

change? Has a federal agency ever created a good inventory or any other valuable guidance product? Will guidelines raise the cost of inventory development and stifle further innovation in interest measurement?

The remainder of this paper is an attempt to clarify these ambiguous questions by putting them in the perspective of how to create better inventories. For convenience, I have organized my thinking about interest inventories and sex bias in four sections: (1) Using Interest Inventories, (2) Evaluation, (3) Scientific Issues and Problems, (4) Recommendations and Strategies.

Using Interest Inventories

This section summarizes some common uses of interest inventories, defines some minimal goals for such applications, outlines the properties of an ideal inventory, defines a biased or poor inventory, and discusses the complex forces that lead to a person's interest inventory scores. For this purpose, I have drawn upon my own experience and the following sources (Craven, 1961; Crites, 1969; Campbell, 1973b; Cole, 1973; Harmon, 1973; Super and Crites, 1962; Kuder, 1971).

Interest inventories are used for many purposes:

(1) to provide information for making better educational and vocational decisions;

(2) to reassure people about a tentative choice;

(3) to give people a structure for understanding the world of work;

(4) to help people resolve conflicting alternatives;

(5) to help people plan their personal development;

(6) to call attention to desirable alternatives that the average person usually does not know about or overlooks;

(7) to help people understand their job dissatisfaction;

(8) to help employers select people who will be better workers;

(9) to help people plan their career advancement;

(10) to aid in the scientific study of the world of work, and to link this research to other research in the social sciences.

These common uses range well beyond what individuals seeking vocational assistance expect an inventory to do. A minimum list of expectations is difficult to define. In general, the more purposes an inventory can satisfy, the more useful it is assumed to be. There is no clear way to decide what these minimum functions should be. Despite this reservation, I would argue that, at a minimum, interest inventories should help people seeking vocational assistance in the following ways:

1. Reassure a person about his tentative choice and suggest vocational options that are equally or more appropriate both in kind and level. Depending on the person, some people will need more alternatives of a given kind, some will need more higher or lower level alternatives, and some will need alternatives of a different kind and at a different level. Here "kind" refers to the content of a job--sales, clerical, artistic--and "level" refers to the level of talent and training required to do a job.

2. Show people all the common vocational alternatives, or through auxiliary materials show them the full range of alternatives. At any rate, through some combination of scales, profiles, or auxiliary materials, a person should be provided the complete range of occupational possibilities where, given the necessary training and job opportunity, a person would find happiness and satisfaction.

3. Interest inventories should rely on a comprehensive and valid assessment of a person's potentials rather than on age, race, sex, or social status, taken out of the context of vocational potential.

These minimum essentials are assumed to be the foundation for most common and desirable uses. For example, attempts to teach people the structure of the world of work are facilitated when an inventory or its associated occupational classification are extensive rather than abbreviated; likewise, the more alternatives an inventory presents, the easier it becomes to locate possible routes of vocational achievement (alias "career ladders") or to find different kinds of work (alias "break the vicious circle").

Before we attempt to estimate how well some popular inventories provide the minimum essentials of useful information or service, it appears helpful first to outline what characteristics an interest inventory must possess to meet not only the minimum essentials but also the full range of desirable expectations.

Ideal Inventories

If an inventory is to provide useful information and to have beneficial effects, it should ideally have many positive characteristics. It should:

1. Provide occupational forecasts of satisfaction and achievement. Although any information about a person or a vocation may be helpful, information with high predictive validity is especially helpful.

2. Provide the full range of vocational options by both type and level. All inventories fail to suggest all possible vocational options even for the most favored persons in our culture (tall, white, college-educated Protestant males without physical or psychological difficulties).

3. Provide information or influences which are stable or reliable from one time to the next.

4. Provide an experience that is effective. Interest inventories should stimulate vocational exploration, reassure people about wise choices, upset people about unwise choices, provide long range perspectives, provide new information (new to the person) such as more vocational alternatives, support persons resisting destructive cultural forces, and promote self-reliance and understanding.

5. Provide information which is in accord with a person's life history, current circumstances, and personal potential rather than factors such as age, race, sex, and social status.

6. Be based on a useful theory of vocational behavior including a classification to organize all possible alternatives. Theoretically-based inventories provide a more explicit rationale that is more amenable to public examination and revision.

7. Include auxiliary materials to increase positive influence and avoid negative side-effects. For example, brochures which summarize information about an inventory's strengths and weaknesses should be included with every test booklet.

8. Be oriented toward the most common occupations and to some degree toward the spectrum of the future world of work.

9. Be adaptable to new educational and occupational information. To some extent, the easier an inventory is to revise, the more likely revisions are to occur.

10. Be relatively resistant to client or counselor abuse and distortion. The more complete, explicit, and independent an inventory is of the vagaries of counselors and clients, the less likely its positive

effects can be twisted by human hands and minds. Likewise, an inventory's simplicity of interpretation and scoring should lessen the possibility that it will be abused.

To gain some perspective about the assets and liabilities of interest inventories, the ideal characteristics have been applied to several interest inventories as well as some other common sources of occupational information. Table 1 compares interest inventories with computerized guidance systems, counselors, and parents. Although Table 1

Insert Table 1 about here

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contains only my subjective ratings, it is likely that there is some consensus (untested) about some of my rankings. For example, Hewer's data (1966) strongly imply that counselor judgment about the realism of vocational choices is poor, while other data indicate that interest inventories have a marked reliability and considerable predictive validity for some purposes (Campbell, 1971).

Table 2 illustrates how the criteria might be applied to some typical

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Insert Table 2 about here

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inventories. These comparisons suggest that no inventory fulfills all criteria. The reader will also see that different people would weight these criteria differentially and should know that the ratings were performed by a person with multiple conflicts of interest. This subjective evaluation is clarified somewhat in the section on Evaluation.

Biased and Poor Inventories

Seen in the context of an ideal vocational interest inventory, a poor inventory is characterized by multiple faults. A poor inventory provides unreliable and invalid information, has little positive influence, is based upon an incomplete assessment, and provides only a narrow range of suggested options.

A biased inventory (sex, race, social status) can be viewed as a special case of a poor inventory. Just as poor counselors sometimes rely upon a favorite inventory, an inflexible interview procedure, or a single aptitude test battery, so biased inventories depend heavily upon a person's sex, age, social status, or an incomplete assessment.

This rationale leads to the following general definition of both poor and systematically biased vocational interest inventories: Those inventories which depend primarily upon the sex, age, social status, or any other characteristic of the recipient rather than upon a comprehensive and valid assessment of a person's assets and liabilities, including one's life situation.

Systematic bias, or the systematic disadvantagement of some special group, must be distinguished from the existing positive correlations between some human potentials and some kinds of job requirements. For example, in our culture, parental, peer, and institutional influences lead to a strong preference for social- and artistic-oriented occupational preferences among women and to mechanical-technical preferences among men. Assessment devices must score or note the effects of a lifetime--to fail to do so would lead to invalid assessment. The detection of sex bias requires a method for differentiating such existing correlations,

which imply a fitness for sex-dominated occupations, from invalid or limited assessments which automatically restrict a person's freedom of choice, either deliberately or through error. These existing correlations have been labelled by some as the "vicious circle"--"discrimination leads to sex-related potential and discrimination keeps us there." This situation holds for everyone--no one escapes his life history. To illustrate, a tall, white Protestant male who at age 28 has just graduated from MIT with distinction in high energy physics is likely to have difficulty finding a job as a guidance counselor. His difficulty would probably have been predicted by a comprehensive and valid assessment.

With the exception of extreme cases, the application of our definition of poor and systematically biased inventories to practical problems will require considerable judgment. For example, if a heterogeneous group of 100 high school girls, after takingan interest inventory, say, "I should become an elementary school teacher," that inventory may be based upon sex alone. Most evaluations about the effects of inventories appear to require judgments about the characteristics of the people using different vocational services and the degree to which the suspected bias or outcome is simply a natural but limited correlate of vocational potential. For example, we don't encourage shy persons to become salespeople, clumsy people to become acrobats, ugly people to become fashion models, or inarticulate people to become writers. Because they assess the effects of socialization, interest inventories will encourage women to enter socially oriented occupations more frequently than men. Likewise, large proportions of men will be encouraged to enter skilled trades and technical occupations. In short, interest inventories would do people a disservice if they encouraged people to enter occupations

that were grossly inconsistent with their socialization experience.

A determination of a poor interest assessment or bias appears to require several tests: (1) Do experts agree after performing ideal vocational assessments that each man or woman was given competent service? (2) To what extent does the distribution of reinforced vocational options produced by a vocational intervention depend on the input and to what extent on the intervention? (3) Does the suspected bias (sex, age, physical disability) represent a rational and desirable capitalization upon a particular characteristic rather than operation of a destructive bias? For example, counselors seek to capitalize on a person's special talents and remaining physical capabilities in helping people cope with physical trauma. Consequently, patient outcomes will usually be related to their strengths which may, in turn, be sex-related characteristics--those characteristics that our culture encourages in each sex.

Positive correlations between sex of the respondent and interest patterning are ambiguous data. For example, if a young man has substantial science interests and weak remaining interests according to the Kuder, the results may be interpreted in at least two different ways: (1) The results may mean that playing a traditional masculine role is of marked importance, or (2) The results may represent some defect of the inventory. But looking at the Kuder or consulting the man are not substitutes for a case study of the person, his life circumstances, and the intervention.

Biases, Personal History, and Heredity

At the time of any vocational assessment of fitness for an occupation, everyone's responses or scores depend upon past experience as well

as innate potential. And no matter what, everyone has to live for a while with his current level of proficiency.

Assessment devices work as well as they do because they score a person for those special life histories that lead to fitness for some groups of occupations as opposed to others. The evidence that documents the effect of differential experience and expectations for men and women in the American culture is vivid, voluminous, and increasing. Table 3 illustrates the divergence in the occupational aspirations of boys and girls that has already begun by the 5th grade and is maintained through the 12th grade. For example, 5th grade girls aspire to Social occupations most (teaching, social work, etc.) and Realistic occupations least (skilled trades, labor, machine operator, etc.). More recent studies report the same trends for second graders (Siegel, 1973) as well as 3, 4, and 5-year-old boys and girls (Kirchner & Vondracek, 1973).

Insert Table 3 about here

Evaluation

The purpose of this section is to review what we know about the effects of interest inventories upon the user. This information has been organized as assumed effects, documented effects, relative effects, and needed evidence.

Assumed Effects

In general, professionals have assumed that interest inventories have the desirable effects listed earlier. Most vocational counselors would

probably say that interest inventories are their standard and most helpful tool in dealing with people seeking help or advice. Counselors have also recognized that interest inventories are sometimes less useful in dealing with women, members of minority groups, and poor people. These beliefs have led to several practices which are assumed to be helpful: having people take several inventories, take male and female forms of the same inventory, abandon inventories for case history evaluations, or use simulated work stations.

Some assumed effects do not require new investigations to document their validity or invalidity for selected purposes. For example, there is sufficient positive evidence to support the use of interest inventories in selection (Crites, 1969). Likewise, Holland has demonstrated that his interest inventory (VPI) and simulation (SDS) are useful devices for investigating and organizing both personal and environmental information (Holland, 1973a). Likewise, the following assumption is contradicted by overwhelming evidence in all studies of the predictive validity of all interest inventories: "Given differences in expressed interests of men and women, how can inventory results do other than reinforce sex role stereotypes?" (NIE, Scope of Work, October, 1973).

The fallacy in the NIE hypothesis is that it confuses an ideal with a state of nature. As a result of growing up in the American culture, the sexes develop somewhat different interests, abilities, and personal dispositions so that they are prepared for somewhat different kinds of work. Consequently, any reinforcement of these vocational predispositions by the taking of an interest inventory must be minute (about one hour) when compared with a lifetime of reinforcement (15 to

20 years). In addition, if the NIE statement means that the results of taking an interest inventory must reinforce, always and only, a person's current aspiration, then it would be valid only if inventory results corresponded precisely with personal aspiration. For example, every man who expresses an interest in becoming a secretary would always have to find that the inventory reports "go do it" (secretary scale, clerical scale, SDS code for secretary). For this situation to occur, an inventory must have a concurrent validity coefficient of 1.00 between expressed choices and scale scores. The facts are: the concurrent validities of the Kuder, Strong, Self-Directed Search, and similar devices range only from about 35 to 68 percent correct identification for categorized or specifically expressed vocational aspirations versus inventory scale scores, profiles, codes, discriminant function procedures. Table 4 illustrates how a typical interest device presents men and women with more options rather than only a person's expressed vocational aspiration. Table 4 taken from the SDS Professional Manual (Holland, 1972) indicates that less than 10 per cent of the people who take the SDS receive specific support for their first choice. (Even this 10% sample of people are shown other closely related choices as well as their first choice). And about 90 per cent of the SDS takers

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Insert Table 4 about here

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are "advised" to consider "closely related" occupations (closely related to their current vocational choice) or "remotely related choices" (different major categories). This evidence indicates in an explicit

way how an interest device lays out a variety of options for most people (90 per cent) rather than simply mirroring a person's current occupational choice. Similar tables exist for other inventories. (See Kuder, 1971, Table 5, pp. 30-31; Campbell, 1971, Tables 2-7, 2-8, pp. 45-47).

These data are sufficient to refute the main reinforcement argument. Advocates of the reinforcement assumption might still argue, "but what about that small proportion (10%) of women who received reinforcing scores?" To clarify this question and the assumed bias, we need to know by some independent assessment how many prospective job holders are in fact "good" as opposed to "poor" prospects. (The proposed definition of sex bias in this paper is applicable here). Finally, an inventory should reinforce some useful proportion of a populations' expressed choices or we are led to an absurd conclusion: a good interest inventory never supports your vocational intentions; therefore, the best inventory is the most invalid inventory possible. Whatever you want to do, the inventory says, "No!"

Documented Effects

In contrast to speculation and opinion about the effects of interest inventories, the evidence about the actual effects of interest inventories is sparse. This situation exists because psychologists have usually been concerned with psychometric problems rather than treatment effects. Consequently, nearly all empirical studies are concerned with reliability, validity, item format, norms, profiles, and related matters. In addition, other studies usually confound the effect of counselors with the effect of interest inventories and other tests so that the specific effect of interest inventories cannot be ascertained (Campbell, 1965).

Effects of the SDS. The Self-Directed Search (Holland, 1972), a simulated vocational counseling device, provides the best evidence to demonstrate the probable effects of an interest inventory. So far, four experimental studies in the United States [(Zener and Schnuelle, 1972; Redmond (1972)], Australia (Long, 1972), and Nigeria (Gesinde, 1973) reveal that the SDS has desirable effects on both boys and girls and men and women. No study found any statistically significant differences between the sexes. Zener and Schnuelle (1972) found that, three weeks after taking the SDS, the number of occupations that high school girls were considering had significantly increased. This positive influence held also for boys, and at all social class levels and in all four high schools studied.

Redmond (1972) also found that the SDS increased the vocational options of both girls and boys. Like the Zener and Schnuelle study, the Redmond experiment used a sophisticated design that is hard to fault. Again, no differences were found favoring boys over girls. Redmond's experiment also indicated that the SDS was successful in stimulating both girls and boys to seek more vocational information. The Zener and Schnuelle experiment failed to get this effect.

A reanalysis of a portion of the Zener and Schnuelle data provides an especially graphic and persuasive account of the effects of the SDS upon the choices of girls and boys. These new analyses are contained in Tables 5 and 6. Table 5, for girls, was created to test the hypothesis that the SDS broadens the number of major occupational groups that girls consider three weeks after the treatment. A second group of girls took the Vocational Preference Inventory instead of the SDS, and a third group received no special treatment.

Insert Tables 5 and 6 about here

Table 5 shows that the girls taking the SDS tend to shift more frequently to other occupational categories after taking the SDS than girls receiving no vocational treatment. The percentages in the right hand column indicate the total percentage of girls who fail to make a major shift in occupational plans (for example, their first and second vocational choices are identical or belong to the same major occupational category on both occasions). Although the percentage differences are not statistically significant ($p < .10$) for the SDS versus the control girls, Table 5 provides no evidence that the SDS discourages women from considering a broader range of alternatives.

Table 6, for boys, shows that the SDS helps boys focus their vocationa objectives. In contrast to girls, the first vocational choices of boys are distributed more widely; thus, after the SDS experience, boys tend to remain more frequently in the same major occupational category. In this regard, it is important to recall that both boys and girls are considering more options after the SDS than before. Other empirical data also indicate that the SDS tends to expand the breadth or variety of occupations a person considers.

Taken together, the four experimental studies and the present evidence about the degree of agreement between one's occupational aspirations and SDS codes (Table 4) strongly suggest that the influence of the SDS is consistent with the objectives of ideal vocational guidance practice--both boys and girls are encouraged or instructed to explore more alternatives rather than to content themselves with a single objective. Put another way, the SDS is especially useful for helping

most people extend their vocational horizons.

The evidence to support or refute the more specific hypothesis that "the SDS discourages women from entering the skilled trades . . . and men from entering office occupations" (Office of Education, 1972) is hard to come by. The data in Table 5 contain only 3 girls who aspired initially to Realistic jobs (some engineering, skilled trades, laboring jobs). Helms and Williams (1973) found only 6 high school girls with skilled trades interest after assessing 1,550 10th and 11th grade girls in three high schools. To make matters worse, the bonafide candidates among the 6 aspirants must be separated from those who are not, before we can conclude anything about sexism. For example, four aspirants might be outstanding candidates for Realistic jobs and two might belong elsewhere. Other data (Nafziger, Holland, Helms, and McPartland, 1972) indicate that two-thirds of the young women in Realistic jobs, interviewed in a large national representative sample, aspire to leave Realistic jobs and want to reenter Social and Clerical jobs. Such evidence implies that many women do not belong in technical and laboring jobs either because current socialization makes them unfit, because they dislike such jobs, or because men drive them out. In any case, a woman whose interest and ability patterns indicate suitability for the skilled trades is not discouraged from entering a trade. The SDS treats all persons as individuals and not as representatives of the group "women."

Effects of Other Inventories. We were unable to locate explicit evidence about the effects of the SVIB or Kuder which was not confounded with other influences (counselors, test batteries, and so on). However,

there is no compelling reason why these inventories should not have effects upon people that resemble those obtained for the SDS.

Relative Effects

It appears useful to see the influence of interest inventories in the context of other influences assumed to affect a person's vocational aspirations. At the same time, it appears helpful to remind readers that even under the best conditions interest devices rarely have effects of great magnitude. Both the Zener and Schnuelle (1972) and Redmond (1972) studies report only small effects on the aspirations and vocational planning of students. The majority of students, although they may be directed to explore some alternatives, continue to aspire to the same occupations.

Other studies reveal that a person's vocational choices are influenced more by almost everything else than by an interest inventory. Surveys of high school and college students present a consistent picture: friends, family, school work, and work experience are the most potent influences whereas counselors and tests are usually at the bottom of these listings. Tiedeman, O'Hara and Mathews (1958) have reviewed these and other data and have reported that social class is the major correlate of vocational preferences.

The self-report evidence appears consistent with the relation of vocational choice to socialization experience, reviewed earlier, and with the experience of vocational counselors. The main roles of interest inventories appears to be one of either confirmation of a desired alternative or the provision of similar alternatives (closely related to the current aspiration) which a person has often been unaware of. This is

not to deny that counselors help resolve conflicts about choices, explore training possibilities, or locate remote alternatives.

At the same time, it is relatively rare for counselors, using a complete kit of psychological tools, to talk people out of their current goal and to direct them (subtly or otherwise) to some remote alternative. Such great shifts, however, are frequent outcomes of direct work or training experience. This clinical experience is valuable because it implies that most people do not respond uncritically to every bit of information that they encounter.

Needed Evidence

There is strong experimental evidence, as reviewed in the previous section, that at least one interest device has several desirable outcomes for both men and women. They include reassurance, more options, and learning something of the world of work. Although it is not documented yet, it seems reasonable to assume that other interest inventories (whose effects have gone untested) have similar effects.

The Zener and Schnuelle (1972) and the Redmond (1972) studies demonstrate that the Self-Directed Search is evaluated by boys and girls in the same way; its effects hold equally for both sexes. Similar studies of other inventories are needed.

Another vital study is implied by our definition of sex bias. In short, we need to examine the effects of interest inventories by using an unbiased criterion or at least a sex-fair criterion. Such studies might proceed as follows: (1) Obtain large samples of men and women or boys and girls. (2) Assess their vocational potentials via standard life histories and assessment devices, except for interest inventories, and arrive at some judgments about vocational potentials. (3) Categorize

these judgments in the same terms as the interest inventory to be evaluated. [(Needless to say, the assessors should be equally divided according to sex and certified for their relative degrees of sexism by using the Spence and Helmreich scale (1972)]. (4) Administer the interest inventory to be evaluated. (5) Compare clinical and interest inventory assessments. (6) Ask assessors and a panel of adults to evaluate the results.

Such studies would be difficult but invaluable in learning whether or not inventories have the biases attributed to them by a few critics. At this time, there is no scientific evidence that interest inventories have any of the negative effects attributed to them by commissions (Office of Education, 1972; AMEG, 1973). Instead, such groups have assumed that inventories must have certain effects, because they are constructed in special ways or have items that look as if they must create certain effects.

Interest inventory manuals could be reviewed to develop a list of an inventory's uses. These advocated uses could be used to specify criteria for assessing effects: reassurance, more options including level and type or kind, understanding world of work. This activity is important because different inventories have both similar and dissimilar influences.

If multiple evaluative studies and projects over a wide range of populations reveal that interest inventories do as much for men as for women, it would be reasonable to assume that interest inventories are "sex-fair." "Sex-fair" equals an equal number of effects of about equal size, but these effects may include both similar and dissimilar influences. Because we have no agreed upon definition of "sex-bias," evaluation of "sex-bias" is much more difficult. The definition advocated by NIE ("within the context of career guidance, any factor that might influence

a person to limit - or might cause others to limit - his or her consideration of a career solely on the basis of gender") is of no use for the following three reasons: a) No interest inventories base results "solely on the basis of gender," but rather on a pattern of interests; b) it provides no procedure for discriminating between the effects of growing up in the United States and some irrelevant limitation unrelated to one's vocational potential; c) the NIE definition, if literally applied, would prohibit parents speaking to their children, husbands to wives, wives to husbands, or lovers to lovers.

Issues and Scientific Problems

This section reviews some of the problems and issues in the development and revision of interest inventories. For this discussion, it is assumed that the goal is to develop or revise inventories so that they possess a maximum number of desirable effects--especially those effects characterized as essential. In this context, sex bias by our definition is only one of several undesirable outcomes to be avoided; other biases include age and social status.

It also appears useful to evaluate interest inventories more by their effects rather than by any other criterion. Good solutions can flow from a variety of methods and materials. In addition, attempts to define a good inventory according to the best method of construction will lead to a freezing of innovation and a failure to focus on the most important immediate and practical concern--when a person takes an interest inventory, what are the outcomes of that experience? Or, how an inventory was constructed is not as important as how well it helps people.

When we focus on outcomes rather than methods, it is easier to see that tinkering with existing inventories or advocating a special method

of scale construction will limit the pool of helpful ideas and will probably produce only minor effects. The creation of effective inventories can profit from an examination of psychometric as well as substantive, theoretical, political, educational, and legal issues. Earlier reports (OE Commission, 1972, AMEG, 1973) present a constricted, over-simplified, and occasionally uninformed perspective which we should resist.

Psychometric and Statistical Issues

Nearly all of the ideas proposed to eliminate alleged sex bias are controversial or involve important value judgments, and none of these proposals has been tested to learn if it actually creates the desired effect.

"Are homogeneous scales to be preferred to empirical keying by using defined criterion groups?" Clark (1961) reported that empirically defined scales, as opposed to homogeneous scales, have more validity for differentiating among occupational samples. In addition, people sometimes find their resemblance to a specific occupational member very helpful. On the other hand, a relatively small set of general interest scales (homogeneous scales) are relatively inexpensive to create and can be used to characterize most occupations. In addition, Nunnally (1967) offers a number of psychometric arguments for the use of homogeneous scales. In short, the choice of a scaling procedure involves questions of validity, funds, client effects, many vocational options (homogeneous scales) versus specific occupational information (occupational scales), and classificatory problems. Consequently, there is no clear winner. The new Strong-Campbell inventory will have both kinds of scales.

"Should single or separate norms for men and women be used?" A single set of norms used with either sex has not been tried; one can only speculate about such norms. Separate norms for men and women are a mixed bag. They reduce a major factor (sexual socialization), but they can be misleading to the user. For example, a woman with high skilled trades interests on female norms may have a very low raw score relative to the level needed to enjoy that kind of work. Similarly, a man with a 60th percentile on an artistic scale may have a very low raw score and little interest compared with people in artistic occupations. In short, separate norms provide "fair" comparisons, but their relation to occupational reality is sometimes misleading. In addition, experience with sex norms for the same occupation indicates that some small proportion of men and women will be distressed because they get higher scores on the opposite rather than same sex norms. Contrary to some opinion, sexual identity is important to many, perhaps most people. But again, we have no clear evidence about the effects of these procedures.

"Should we have separate forms for different age groups and sexes?" This area is another no-person's-land. Either we don't know, or it depends. Special forms for special groups appear to have two likely disadvantages: (1) they are apt to encourage a limited number of options, and (2) such selections are apt to be biased because of some restricted purpose--jobs for older women returning to work, jobs for the handicapped, jobs for older persons. These effects will occur because special forms for special populations will present only a portion of the world of work. Users will then conclude that this restricted portion is everything possible rather than only the more likely possibilities.

Not unimportant, multiple forms are more expensive and in the long run those costs will be passed on to the consumer. Again, these questions would be easier to resolve if we had experimental studies of the actual effects of single versus separate forms.

"Is the single form of an inventory the best resolution?" Single forms have several important strengths: (1) everyone is confronted with the same stimuli (questions, ratings, judgments), (2) everyone is scored in identical fashion, and (3) everyone can be shown an identical set of occupational options. However, identical stimuli do not guarantee identical outcomes.[1] If an interest inventory consisted of two items: Would you like to be: (1) a children's clothing designer?, and (2) a mechanical engineer?--about 90% of the women would say "Yes" to 1, and "No" to 2. And men would have a reversed pattern of responses.

The potential resolutions of this situation are multiple and largely unsatisfactory: (1) Omit all items which men and women or other groups respond to differently. Perhaps 40% of the available items would have to be omitted and that step would vitiate an inventory's validity. (2) Revise the items using an iterative procedure until the distributions of outcomes for men and women are the same--an impossibility according to some developers, unlikely in view of our current knowledge of sex differences in interests, and undesirable if we wish to take these individuals' differences into account.

"Should we revise the content of interest inventories to reduce their alleged sex bias?" Harmon (1973) has proposed that we "excise the concepts of men and women" so that no charge of sexism could be made.

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[1] I am indebted to David P. Campbell for this insight.

Again there is no clear evidence that words like "salesman" have any effect on the test-taker that is significantly different from "salesperson." Nevertheless, several inventories have made a few or wholesale revisions of this kind (Campbell, 1974; Holland, 1972).

A closely related and perhaps more important question is whether or not we should remove or revise items that represent experiences normally withheld from women or men in our culture. For example, "I can use a power saw," or "I can use a sewing machine." Again, we need to learn if the effects of deletion or revision are in the average user's best interests rather than to make revisions only to pacify some political action group. The number of groups who might decide to rewrite interest inventories is potentially large and could conceivably deprive the majority of unconcerned and satisfied users.

A promising strategy would be to review an inventory's content to learn if it is "sex-fair"--that is, if about half of the items favor each sex. Such a compromise would keep sex in the inventories as well as in the culture. In this regard, we need to learn if there is in fact a pool of useful items (now omitted from inventories) that we could use to balance and revise inventory content. For convenience, this hypothesis has been labelled as the "Unused Item Pool" hypothesis.

In making such revisions it is important to avoid creating inventories that lack validity because most of the difficult items have been watered down so that an Indiscriminate Interest Inventory is created. For example, as items become easier, they often become meaningless. The following burlesque illustrates the problem.

Regular Item: "I can make simple plumbing repairs."

Moderate Difficulty: "I know what a faucet washer looks like."

Easy Item: "I can find 'plumber' in the yellow pages."

Other methods for scoring and classifying people according to their special interests have similar problems. Cole (1973) reported informally that a discriminant function procedure produced a more even distribution of women across fields but also produced invalid categorizations. Some women who wished to become elementary teachers were classified as potential skilled trades persons.

In general, the revision of the content of different interest inventories and simulations involves different psychometric problems. Consequently, it is not possible to prescribe specific procedures for revision that will hold equally for all devices and inventories. Again, the practical resolution is to evaluate and revise inventories according to their effects upon the user.

"Can we develop a definition of sex-fairness and also secure consensus among experts and lay people?" The answer appears to be "No." Lynn (1973), after reviewing a variety of statistical proposals for estimating test fairness in selection, concludes that "there is more than one reasonable definition of test fairness and these definitions are in conflict...we must look beyond a simple technical resolution of the problem." In a closely related report, Hoepfner and Strickland (1972) also review the methods for establishing test bias and come to the same conclusion. Nevertheless, they defined test bias as an item-by-race interaction in an analysis of variance design, but their empirical results were ambiguous. Their evidence does not clearly support the hypothesis "that the differential familiarity, relevance, and interest-arousing aspects of items underlie the observed group differences" among blacks, whites, orientals, Mexican-Americans. Instead, the results suggest that the Stanford Achievement Test is "biased in favor of Orientals"--an

implausible conclusion--for few differences involved whites and many involved Orientals. In a similar paper, Darlington (1973) argues that "there can be no generally applicable objective statistical definition of a culture-fair test and instead we should attempt to develop tests with maximum construct validity."

Substantive Issues

There is a large body of data which clearly demonstrates that men and women (boys and girls) respond to many test items in divergent ways. Campbell's new manual (1974) for the Strong-Campbell Interest Inventory reports some outstanding examples of sex differences. The manual for the Vocational Interest Profile (ACT, 1970) provides similar data in a more indirect fashion. For example, the average Household scale score for a national female sample is about one standard deviation higher than the average score for males. The average Agriculture scale score for men is almost 2 standard deviations higher than the average score for women. In the norms manual (ACT, 1971), only 10 per cent of the college women rate themselves as above average in "mechanical ability"; whereas 57 per cent of the men rate themselves above average. Perhaps the most persuasive data is provided by Hansen and Johansson (1972) who developed a set of six Holland scales of equal length by using the women's form of the Strong and samples restricted to women. Table 7 shows that when large samples of women were rescored on these scales, their profiles exhibit the same gross trends observed in SDS profiles:

Insert Table 7 about here

Women still prefer Artistic and Social occupations and activities and still dislike Realistic and Enterprising items. These data are strong evidence that interest profiles are largely a function of the person and not the inventory. Data such as these have been overlooked and ignored because few people were interested earlier and because the conversion of raw scores by various normative procedures to special scale scores separates test users from the more concrete evidence. Similar data are contained in other manuals and normative tables for other interest inventories and aptitude tests (Bennett, Seashore & Wesman, 1959).

These data support the conclusion that equal treatment (single form of an inventory) does not lead to identical outcomes. Consequently, the best possible outcomes we can hope for are different but equally useful outcomes for men and womem. Different kinds of people will get different kinds of help from taking an interest inventory. The best inventory will provide as many benefits for one group as another. This conclusion is a restatement of how many people conceive the evaluation of psychotherapy. People come to therapy for different purposes; consequently, evaluations should be in terms of those purposes. In the SDS study reported earlier, the effects appear to be appropriate for each sex: broadening goals for girls and focusing goals for boys, because girls' goals have been constricted while boys may have had too many options to cope with easily.

Three other pieces of substantive knowledge are relevant and important to recall. (1) The little information we do have about the effects of inventories is generally positive, (2) the magnitude of the effects is small, (3) there is abundant naturalistic observation to

suggest that vocational aspirations are sex-typed at an early age and very resistant to manipulation. For instance, elementary schools are stocked primarily with women as role models, yet the distributions of small boys' choices show no drift toward feminine choices. To the contrary, the masculinity of boys' choices increases to a peak about ages 16 to 18. Similarly, little girls' choices show no appreciable drift either. At older ages, college students drift from opposite sex fields to fields dominated by their own sex (Astin & Panos, 1968).

Theoretical Issues

A strong case can be made for the usefulness of typologies for organizing occupational and personal data (Maddi, 1968; Holland, 1973). When the present problem is seen in the context of a theoretical typology, sexual socialization is only one of several major cultural influences which shape a person's vocational fitness and aspirations (what aptitudes will be developed or ignored, what personality traits and values will be reinforced or deprecated, what life styles will be encouraged or discouraged). For example, a person's social class origin, racial and religious background, parental occupation, father's values and goals, mother's child-rearing attitudes, all influence the personal development and occupational aspirations of children, adolescents, and adults. (See Werts, 1968; Kohn & Schooler, 1969; Whitney, 1970; Nafziger, et al., 1972; Holland, 1973).

With this background, it appears more rational to use the strengths and weaknesses due to the typing effects of a person's life history rather than to ignore the outcomes of such experience. Such uses do not mean always giving into one's past but rather learning how to make constructive use of that experience. Inventories not only tell us where

we have been (an inventory is the record of a person's reinforcement experience) but also point out many closely related possibilities. More adventurous persons can use classifications to plan the attainment of more divergent goals.

Educational Issues

It may be more helpful to include in auxiliary materials special warnings and advice about the limitation of interest inventories than to engage in subtle revisions or to conduct long range inventory educational programs for counselors, parents, and teachers. For example, different inventories could include statements about their possible or known limitations in the same way many now have a disclaimer about interest profiles having little to do with aptitude. Also, the auxiliary materials might have much more effect than changing "man-made" satellite to "person-made" satellite, "draftsman" to "drafter." Auxiliary materials could discuss sexism and career development along with the effects of age, social class, and physical defects. Persons choosing to resist these influences would be guaranteed automatic defensive ammunition rather than having to depend upon enlightened counselors, parents, teachers, or employers.

Recommendations and Strategies

The following suggestions are presented to increase the quality of interest inventories. This concern with overall quality is preferred to a narrow focus on sex bias for many reasons:

(1) Sex bias is only one of many possible defects of an interest inventory.

(2) The assumed signs of sex bias have already been eliminated or were never present in most inventories. The Strong has undergone a radical

revision--one form for both sexes; men and women are scored for all scales; and all scales have been reorganized according to a theoretical scheme. The Kuder has followed suit (men and women are scored for all scales). All other inventories use a single form for both sexes, use norms or absolute scores, usually provide a simple to elaborate occupational classification scheme to show a person a wide range of occupational options. In addition, the SDS, despite its positive experimental tests, has undergone some minor revision; additional occupations were added for women, and some titles were revised to eliminate sexual content.

(3) The elimination of sex bias focuses on a negative goal. We should be more concerned with the development of inventories that foster everyone's best interests.

(4) Nearly all proposed revisions are controversial, because we now lack clear or gross evidence of sexual bias.

(5) No one needs to be persuaded about improving the quality of interest inventories, but many still find sexual bias difficult to appreciate or comprehend.

The following sections outline some practical plans for improving the influence of interest inventories. Because we have so little evidence about the actual impact of these devices, it is assumed that these proposals are at least consistent with current knowledge.

Improving Inventories

Among the many possibilities for constructive change, the development or revision of auxiliary materials appears most practical. Although most inventories are accompanied by such materials now (principles of career development, classification schemes, warnings about limitations, and next steps) such materials can be revised to cope with

the special limitations of each individual inventory--its assumed sex, age or social status biases, how to expand the options suggested by the inventory, and the role of a person's life history in his interest development. Additions or revisions of this kind could be done quickly and cheaply. Equally important, better auxiliary materials should be more influential than the changes involved in revising inventory items, or devising special scoring or classification procedures which would probably be too subtle to be noticed by most persons.

A second possibility is to encourage the creation of inventories which provide the full range of options for all people. The more comprehensive the range of occupational options an inventory presents, the less likely it is to be biased pro or con men versus women, old versus young, or high versus low social status, because everyone is treated alike; or at least everyone has an opportunity to see all options. Inventories developed only for men or women, young or old people, or people destined for low level jobs (or high level jobs) may limit a person's occupational outlook both with regard to the level and kind of occupation. Such limitations appear to be automatically restrictive, but some studies of their actual effects seem desirable.

A third need is to encourage the experimental examination of the influence of interest inventories. So far they get positive scores, but it would be helpful to learn whether or not special norms, classifications, item revisions, or any other revision has the assumed and desired effects. This kind of study is sorely needed to sort out what we know from what has been assumed. There is no clear method for the creation of the best inventory, but experimental studies do provide a method for

evaluating a great range of psychometric procedures against a common set of criteria about their influence.

Finally, authors and publishers should be encouraged to review their interest inventories for the following purposes:

1. Does the inventory item pool appear to favor men or women? If yes, can the pool be balanced? Should the pool be balanced? Are there any other solutions?

2. Is the range of options as large as financially feasible and practical to use?

3. Do options cover all levels of talent and a full range of content or kind?

4. Do items permit respondents to indicate interests not yet experienced but ones the respondent feels capable and eager to do?

5. Are there any items that are not in the best interests of any group no matter how small?

6. Are occupational options oriented only to the past?

7. Is there a consensus from users about inventory defects that can be remedied or at least softened in printed auxiliary materials?

Counselor Training

Counselors can participate most constructively in the use and interpretation of interest inventories by continuing to play their traditional role, by engaging more frequently in talent stimulation, by using interest inventories and classifications to plot career development, and by using occupational classifications to aid a client's personal development.

Traditional Role. In the past, it has been customary to describe the counselor's role in vocational counseling as that of a somewhat objective integrator and stimulator of wise vocational decisions who

provided insight, encouragement, and information. Other interventions (computer-assisted counseling programs, inventories, work books, and tests) are assumed to play similar roles. Although counselors cannot be objective any more than mothers or fathers can, counselors can and do serve as advocates of the individual. Other interventions can also play a helpful role by treating everyone in the same way, showing all the alternatives, providing all the information, and by avoiding built-in limitations that may restrict the perspectives of users.

Personal and impersonal interventions should work for the individual. Any other role would be less helpful and probably destructive. Occasionally, teachers and parents want to enlist counselors to work for particular decisions. In a similar vein, a few women's rights groups want counselors to advocate the skilled trades for women and office occupations for men. Sympathetic as some counselors may be to such pleas, a positive response would reduce a counselor's ability to serve the best interest of the individual and compromise his professional responsibility. It is still not possible to help a person explore alternatives and press for a special alternative at the same time. Vocational interventions of all kinds can serve people best by helping them freely assess their current assets and liabilities, to prepare for the life and vocation they want to live, and to inform and stimulate people to attain greater vocational fulfillments.

In this connection, it is important to recall that interest inventories were developed in large part to replace the subjective and unreliable advice of well-meaning friends and relations. And, unlike friends and relations, the reliability and validity of the information provided by interest inventories is amenable to corrective action by

empirical and public tests.

Talent Stimulation. The constricted life experience of many, perhaps most women, suggests that they need to be encouraged to try out the full range of their interests and talents. Like other oppressed groups, women often have no experience with which to test their potentials. Dailey's training materials (Dailey, 1968) may assist women in discovering their talents and future possibilities. Counselors should also learn to assist women in coping with a variety of job-related problems. For example, Bem and Bem (1973) have prepared a manual for counselors to help women gain new perspectives on themselves, their careers, and their families. Likewise, Pearlman and Resnikoff (1973) have prepared a leader's guide to accompany a stimulus film for women, "Back to School, Back to Work." These and similar materials should prove to be as influential as interest inventories.

Planning Career Development. Interest inventories can be used to help people plan their career development rather than as devices to be abandoned or revised to secure more desirable scores. For example, if a woman receives a low Realistic score on the SDS, a low Mechanical score on the Kuder, or low skilled trades scores on the SVIB, she can with the help of a sensitive counselor use such information to plan what she wants to do about such scores and her life goals. She may decide that she still wants to try the skilled trades. In that case,her low scores and their scale content can be employed to learn some of the things she must learn to like and do well, where to get the training, part-time or full-time first job, and what to expect. In short, a person's scores are intended to be used to a person's advantage and should not be regarded as alien

information to be denied. Many counselors perform these functions well now; we need many more who will do so.

Using Classifications. Occupational classifications or maps can be used to help people see the psychological distance between their present job or interests and more remote objectives and to plan accordingly. Cole (1973) has demonstrated the similarity of structure between men's and women's vocational interests, and Cole and Cole (970) have summarized a method of mapping occupations for counseling purposes. Occupational classifications can be used in the same way. For instance, Holland's classification (Holland, 1973) can be used for a variety of purposes: (1) understanding the differences between divergent choices, (2) finding similar vocational alternatives when one alternative is blocked because of lack of opportunity, (3) finding similar alternatives but at different levels of competency, and (4) for planning successive jobs to reach a more remote goal. Needless to say, the DOT can be used in the same way, but it is an unscientific and unwieldy encyclopedia.

In conjunction with interest inventories, correlated classification or mapping schemes make it possible to show women and men the full range of vocational possibilities. Unfortunately, counselors receive relatively little training or encouragement to perform this valuable activity.

Research

Although doing research is a long range strategy, it provides public evidence for clarifying and revising our ideas about vocational behavior. In the context of the present problems, two kinds of closely related studies appear especially useful: (1) Evaluative studies to develop a clearer knowledge of how vocational interventions and their revisions

affect people. So far, we have only a few experimental studies of this type (Krumboltz and Schroeder, 1965; Zener and Schnuelle, 1972; Redmond, 1972). These studies appear especially helpful for learning about the effects of specific revisions of inventories, tests, and simulations. (2) Theoretical and substantive studies to develop a better knowledge of the development of vocational aspirations--especially the determinations of the most potent influences at younger age levels.

Other goals might involve research to locate men and women who have moderate to high potential for jobs dominated by the opposite sex. Such studies might include:

1. Longitudinal studies of persons who have made the transition from female- to male-dominated jobs or vice-versa with different degrees of achievement and satisfaction. Do men with high femininity scores make the transition to office jobs more easily than men with high masculinity scores? Do MF scales provide a useful index of socialization and occupational flexibility? Studies of originality repeatedly imply that femininity is a correlate of originality in men (Barron, 1953). Such studies would be a rich source of ideas about crucial personal traits, environmental supports and barriers that lead to or block transitions between sexually-stereotyped jobs.

2. Comparisons of men and women holding the same job. Are they alike? Do they perform equally but make use of different clusters of personal competencies and personality traits?

3. Applications of current theories of careers to men and women in the same occupation. Do the theories need revision?

4. Will experimental tests of the use of Dailey's training materials (Dailey, 1968) identify women with skilled trades talents?

In other research, we need to examine and test ideas like the following:

1. Will school systems with no sex restrictions on course selection produce students with a more heterogeneous distribution of vocational interest profiles?

2. Will parents without narrow sex role preferences produce children with less stereotyped choices and less divergent interests?

3. Will communities which provide a variety of nondiscriminatory part-time work activities for boys and girls encourage a greater variety of vocational aspirations?

4. As sexism decreases in society, will the distributions of men's and women's occupational choices and inventory codes or profiles become more similar? The Strong, Kuder, and similar assessments could provide useful criteria for assessing the socialization experiences and restrictions of men and women of different socioeconomic status, living in different communities and societies, etc.

We need more studies of why the interest inventories work so well. Such studies would tell us what interventions affect the vocational interests of young people and at what ages. For example, a careful and comprehensive study of the SDS and its rationale should allow us to specify with considerable precision the situational forces that create specific patterns of preferred activities, competencies, vocational preferences, and self-conceptions. When that task is accomplished, it would be possible to outline more potent interventions for creating changes in vocational aspirations or interest.

The potential power that this knowledge should bring raises several ethical issues. Who should control such power and what social groups

should participate in such decisions? This issue does not seem important now because current interventions to reduce occupational stereotyping are coming too late and appear to have little impact. For example, opening auto mechanics courses to women will induce only a few women to enter. A more practical approach would be to change men's and women's conceptions of work and themselves long before such opportunities arise. So far, pre-school experiences, parents, and relatives appear to hold the key to the formation of work roles and self-attitudes, although subsequent experience can soften or modify these conceptions of self and work.

Social Action

The vocational options for all persons can be increased by several social actions. One short range strategy is the removal of educational or experiential barriers that prevent girls and women, blacks and other groups from learning about their interests and competencies and from incorporating them fully into their self-definition. Actions based on this strategy are on the increase--opening all educational experiences to men and women (shop and home economics courses, etc.), reducing the use of sex-stereotyped activities and classroom materials in elementary schools, eliminating sex discrimination in part-time jobs for young people so that both boys and girls can secure a more comprehensive and accurate self-appraisal. Any action that will broaden everyone's pre-vocational experiences will influence interest inventories.

Professional commissions should continue to stimulate discussion and to press for rationality and fair play. In this regard, commissions might be more influential and productive if they had broader or more

balanced representation including consumers and test publishers.[1] It is difficult to think of someone who clearly lacks a conflict of inerest, but it is relatively easy to insure that the major points of view are at least represented. Some continued formal reporting appears helpful. At the same time, some informal, unreported private meetings of commissions which are more representative of everyone concerned may be more helpful.

Legislative action designed to improve vocational services or to remedy bias appears especially inappropriate. The definitions of poor or biased service appear to hinge on subjective judgment except in the most blatant cases. Until we have a consensus about the definitions, causes, and remedies for biased services, legislative activity might create a new trap by promoting a destructive group of principles. Attempts to legislate more options for women have already backfired at AT&T (Time, 1973). Men are getting women's jobs, but only a few women are moving into men's jobs.

Some Conclusions

The following conclusions attempt to summarize my interpretation of the data and my experience as a researcher and practicing vocational counselor. I would have more confidence in these conclusions and those of other participants in this controversy if we had abundant and explicit evidence. As it is, we must do the best we can with what we have.

1. There is no evidence of sex bias in interest inventories if you assume an unbiased criterion must be used to make such determinations.

2. So far, charges of sex bias in interest inventories rest on imagined effects and words assumed to be offensive to women.

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[1] The OE Commission employed 14 women and 3 men.

3. Inventories should be evaluated for their "sex-fairness"--do they have effects or outcomes for both sexes which are about equal in number and magnitude, although such effects may differ in kind?

4. We lack consensual definitions of both sex bias and sex-fairness, although we may be able to get some consensus about sex-fairness.

5. Legal action is unwarranted until some clear and compelling evidence is marshalled for a general sex-bias in interest inventories.

6. Sex bias is only one of many potential biases; other major biases might include social class, race, and religion.

7. A strategy of improving inventory effects for everyone is superior to a focus on sex bias.

8. The distributions of vocational aspiration among men and women differ because men and women have different life histories, not because interest inventories possess sex-biased characteristics. Changing women's lives will change their scores.

9. Many proposals to revise inventories are equivalent to changing thermometers until you find one that lowers your temperature.

10. Interest inventories are assessment, not social action, devices. Attempts to make them otherwise are an anti-intellectual, anti-scientific, destructive activity.

11. Inventories are being made more useful by a continuation of many current trends and activities--creating more options, improving auxiliary materials, performing more studies of the real rather than imagined effects, and so on.

Table 1

Application of Some Ideal Criteria for Assessing the Quality of Vocational Interest Inventories and Other Sources of Occupational Information

Ideal Characteristics	Interest Inventories	Computer Guidance Systems	Counselors	Parents
Validity?	1	2	3	4
Range of Options?	3	1	2	4
Reliability?	1.5	1.5	3	4
Effectiveness?	1.5	1.5	3	4
Non-biased?	1.5	1.5	3	4
Efficient?	1.5	1.5	3	4
Theoretical Base?	1	2	3	4
Auxiliary Materials?	2.5	2.5	1	4
Common & Future Occupations	3	1	2	4
Adaptable?	4	3	1	2
Resistance to Abuse?	2	1	3	4
Efficient?	1	2	3	4
Other?				

Note: (1 - high; 4 = low). If the reader substitues his favorite inventory, parent, counselor, or guidance system in this table, he (she) will obtain a different but similar picture.

Table 2

Application of Ideal Criteria to Some Interest Inventories

	Kuder O. I. S.	Strong-Campbell	SDS
Validity?	3?	1?	2?
Range of Options?	2?	3?	1?
Reliability?			
Effectiveness?			
Non-biased?			
Efficient?			
Theoretical Base?			
Auxiliary Materials?	1?	2?	3?
Common & Future Occupations?			
Adaptable?			
Resistance to Abuse?			
Efficient?			
Other?			

Note: If the reader will attempt to rate these three inventories from 1 (high) to 3 (low) on each ideal characteristic, the ambiguities and the need to weight some characteristics more than others will become immediately apparent.

Table 3

The Vocational Aspirations of Urban Students for the 5th-12th Grades

Grade	Sex	Real.	Inv.	Art.	Soc.	Ent.	Conv.
5th	B	36	28	10	19	3	4
	G	3	12	15	57	8	5
6th	B	44	33	4	16	4	0
	G	0	15	18	49	14	3
7th	B	38	16	9	24	14	0
	G	3	8	18	50	8	14
8th	B	38	21	15	18	8	0
	G	1	13	11	43	13	20
9th	B	23	23	15	31	8	0
	G	0	13	13	67	0	0
10th	B	20	26	14	23	4	13
	G						
11th	B	9	33	5	7	9	2
	G	0	28	7	26	1	2
12th	B	5	1	1	3	1	0
	G	1	14	6	23	3	18

Note. These are accidental samples obtained in a large city school system by some undergraduate students (Sirkis & Weingarten, 1973) using a free response form. Note that boys favor R, I, and S jobs; whereas girls favor S, A, and C jobs.

Table 4

Agreement between a Person's SDS Summary Code and Code of Current Occupational Aspiration for Samples of High School and College Students

Degree of Agreement		Boys (N=218) % Agree (Cum. percentages)	Girls (N=148) % Agree (Cum. percentages)	Men (N=355) % Agree (Cum. percentages)	Women (N=362) % Agree (Cum. percentages)
6	Letters and order exactly same (e.g. RIC, RIC)	9.0	9.0	11.8	14.1
5	1st and 2nd letters of SDS code match 1st and 2nd letters of other code (e.g. RIC, RIE)	23.0	14.0	21.7	25.1
4	Letters of SDS code match letters of other code in any order (e.g. RIC, ICR)	35.0	28.0	27.0	39.5
3	1st letter of SDS code matches first letter of other code (e.g. RIC, REA)	58.0	51.0	45.6	65.7
2	1st and 2nd letters of SDS code match any two letters in the other code (e.g. RIC, IER)	68.0	71.0	61.4	74.3
1	1st letter of SDS code matches any letter in the other code (e.g. RIC, CRE)	83.0	88.0	33.7	97.8
0	1st letter of SDS code is not included in other (e.g. RIC, CES)	100.0	100.0	100.0	100.0

Table 5

The Effect of the SDS, VPI, and Control Experiences on the Vocational Choices of High School Girls

		2nd VC (SDS Experience)							% Same Category
		R	I	A	S	E	C	Total	
1st VC	R	—						0	
	I		6				2	8	
	A		1	4	1			6	68.80%
	S		1	3	13		4	21	
	E		1			5		6	
	C			2	4		12	18	
	Total	0	9	9	18	5	18	59	

		2nd VC (VPI Experience)							
		R	I	A	S	E	C	Total	
1st VC	R	1	1					2	
	I		10		3			13	
	A			5		2		7	72.73%
	S		3	1	19	1	1	25	
	E					2		2	
	C		1	1	4		11	17	
	Total	1	15	7	26	5	12	66	

		2nd VC (Controls)							
		R	I	A	S	E	C	Total	
1st VC	R	1						1	
	I		4	1	1		1	7	
	A			2	2			4	73.85%
	S		2		24	1	5	32	
	E				1	3	1	5	
	C		1		1		14	16	
	Total	1	7	3	29	4	21	65	

Table 6

The Effect of the SDS, VPI, and Control Experiences on the Successive Vocational Choices of High School Boys

		2nd VC (SDS Experience)							% Same Category
		R	I	A	S	E	C	Total	
1st VC	R	7	2					9	
	I		23			1		24	
	A			4				4	86.36
	S			1	1		1	3	
	E			1				1	
	C						3	3	
	Total	7	25	6	1	1	4	44	

		2nd VC (VPI Experience)							
		R	I	A	S	E	C	Total	
1st VC	R	13	2				1	16	
	I	3	7	1	1			12	
	A			4	2	1		7	75.00
	S				9			9	
	E				1	4		5	
	C	1			1		5	7	
	Total	17	9	5	14	5	6	56	

		2nd VC (Controls)							
		R	I	A	S	E	C	Total	
1st VC	R	13	2		1			16	
	I	3	18		1	1		23	
	A			2	2			4	71.43
	S		2	1	4			7	
	E	1			2	4	1	8	
	C		1				4	5	
	Total	17	23	3	10	5	5	63	

Table 7

Raw Score Means and Standard Deviations of Women-In-General Used for Conversion to Standard Scores

Scale	Set I[a]		Set II[b]	
	Mean	S.D.	Mean	S.D.
Realistic	- .31	5.53	-1.49	7.63
Investigative	1.18	6.09	2.72	8.07
Artistic	4.39	6.10	6.09	8.49
Social	3.18	5.02	4.18	6.93
Enterprising	- .12	5.20	.20	7.39
Conventional	1.10	5.56	-1.05	7.57

[a] All Set I scales contain 14 items.

[b] All Set II scales contain 20 items.

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